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Equipment Condition Report

Overall Diagnosis

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Machine ID:	**Storage Tank**	Product (h/km):		Lab Sample N°:	**GP708**
Application:		Machine (h/km):		Label N°:	
Make/Type:		Filter (h/km):		Equipment Ref. N°:	**LGP645**
Cust. Order N°:		System (l):		Sample Taken:	15/09/2014
Product:	Shell Tellus T 32	Top-up (l):		Sample Received:	25/09/2014

GP708
15/09/2014

Reported Maintenance:

unused lube oil.

Comments Oil Condition:

Visual aspect: yellow coloured, clear and bright, without visual foreign matter.
The water content is not significant: 70 ppm.
The kinematic viscosity @40°C, 31.95 mm²/s, complies with the mentioned ISO VG32 specification limit.
The kinematic viscosity @50°C is 22.22 mm²/s
The kinematic viscosity @60°C is 16.13 mm²/s
The kinematic viscosity @70°C is 12.14 mm²/s
The kinematic viscosity @100°C is 6.11 mm²/s
The oil's acidity is considered acceptable for this application: 0.57 mgKOH/g.
The ICP spectromertric results for the wear elements and silicon are all below the detection limit.

Comments Machine Condition:

The current WPC , 51.6 is too high for an unused sample.
The microscopic evaluation of the ferrogram shows small ferrous rubbing wear platelets, <15 µm.
We even found some larger ferrous fatigue chunks and flakes with a maximal diameter of 20µm.
Heat treatment shows that the ratio of low/medium alloy steel particles is approximately 70/30.
The present amount of dark magnetic iron oxides is remarkable, they are indicative for abnormal wear mode.
The non-ferrous wear mainly retains small blank metal particles, max 25µm.
The contaminant particles present mainly are crystalline particles (dust, sand), lube degradation products, polymeric matter.

Recommendations:

No rating as this is an unused sample from a storage tank, however the ferrographic analysis indicates larger wear particles and contaminant particles.
Ensure representative sampling!!!!!

Sample Reported: 26/09/2014 Nathalie De Vlam

Recommendations are advisory only and based on the assumption that equipment data and sample are accurate and representative of component being sampled.

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Test Name	Method	Unit	Results
			GP708
PHYSICAL-CHEMICAL ANALYSIS			
Colour	ASTM-D1500	-	**1.5**
Visual appearance	OMS 13882	-	**clear**
Determination of water (KF)	ASTM-D6304	ppm	**70**
Kinematic Viscosity @40°C	ASTM-D445	mm²/s	**31.95**
Kinematic Viscosity @100°C	ASTM-D445	mm²/s	**6.110**
Acid Number (AN)	ASTM-D664	mg KOH/g	**0.57**
ELEMENTAL ANALYSIS			
Aluminium	ASTM-D5185	ppm	**0**
Barium	ASTM-D5185	ppm	**0**
Calcium	ASTM-D5185	ppm	**13**
Chromium	ASTM-D5185	ppm	**0**
Copper	ASTM-D5185	ppm	**0**
Iron	ASTM-D5185	ppm	**0**
Magnesium	ASTM-D5185	ppm	**36**
Molybdenum	ASTM-D5185	ppm	**0**
Sodium	ASTM-D5185	ppm	**5**
Nickel	ASTM-D5185	ppm	**0**
Phosphorus	ASTM-D5185	ppm	**290**
Lead	ASTM-D5185	ppm	**0**
Silicon	ASTM-D5185	ppm	**0**
Tin	ASTM-D5185	ppm	**0**
Zinc	ASTM-D5185	ppm	**311**
Potassium	ASTM-D5185	ppm	**1**
WEAR INDEX			
Optical density - large	OMS 13875	-	**48.1**
Optical density - small	OMS 13875	-	**3.5**
WPC - Wear Index	OMS 13875	-	**51.6**
% Large particles	OMS 13875	%	**86**
ANALYTICAL FERROGRAPHY			
FERROUS			
Rubbing wear	ASTM-D7690	µm max.	**< 15**
Severe sliding wear	ASTM-D7690	µm max.	
Abrasive wear	ASTM-D7690	µm max.	
Fatigue chunks	ASTM-D7690	µm max.	**20**
Fatigue flakes	ASTM-D7690	µm max.	**20**
Spheres	ASTM-D7690	µm max.	
Dark oxides index	ASTM-D7690	-	**3**
Red oxides - Rust index	ASTM-D7690	-	**1**
Corrosive wear	ASTM-D7690	µm max.	
Ferrous wear - Severity index	OMS SWI 2.4	-	**4**
NON-FERROUS			
White metal alloy wear	ASTM-D7690	µm max.	**25**
White metal alloy - Severity index	ASTM-D7690	-	**2**
Copper alloy wear	ASTM-D7690	µm max.	
Copper alloy index	ASTM-D7690	-	
Non ferrous wear - Severity index	ASTM-D7690	-	**2**
CONTAMINANTS			
Crystalline particles index	ASTM-D7690	-	**3**
Amorphous particle index	ASTM-D7690	-	
Friction polymer severity index	ASTM-D7690	-	**2**
Fibres - Severity index	ASTM-D7690	-	**1**
Other contaminants index	ASTM-D7690	-	**3**
Contamination severity index	ASTM-D7690	-	**3**

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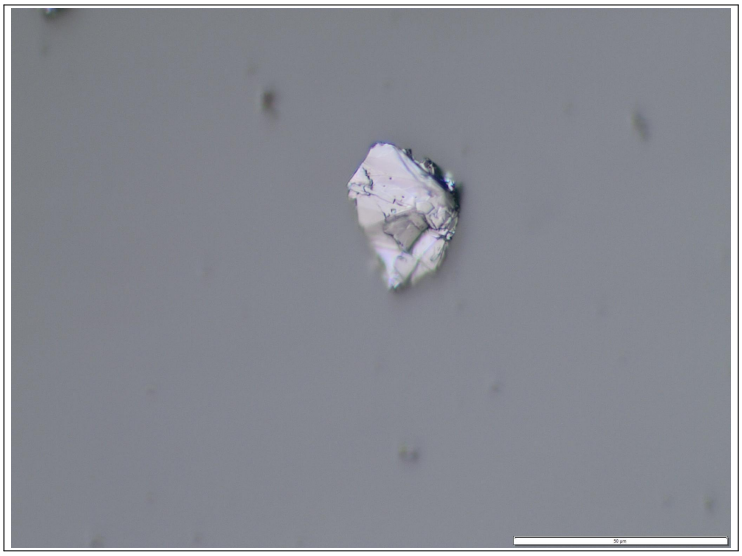
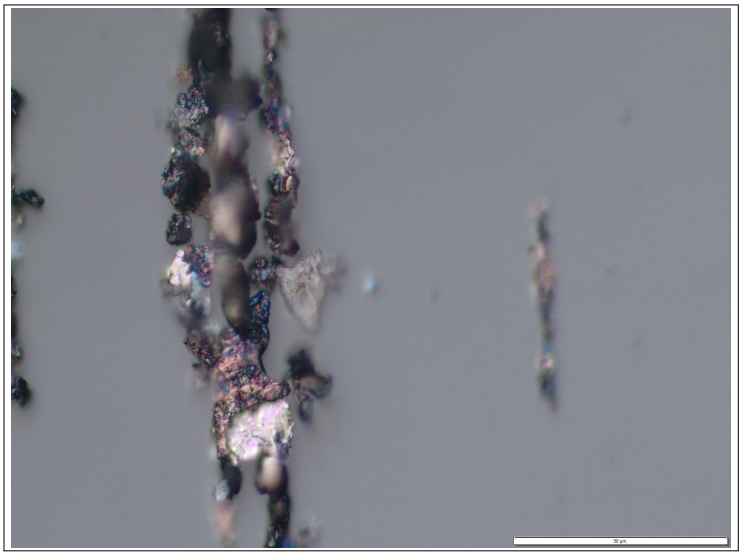
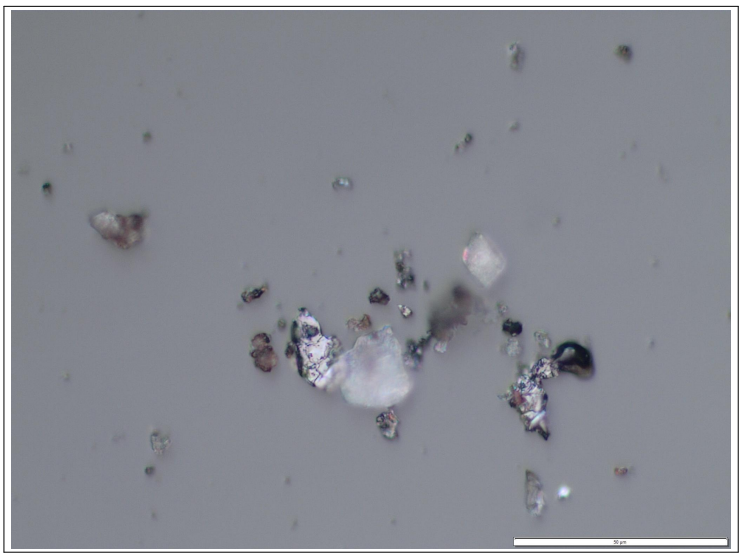


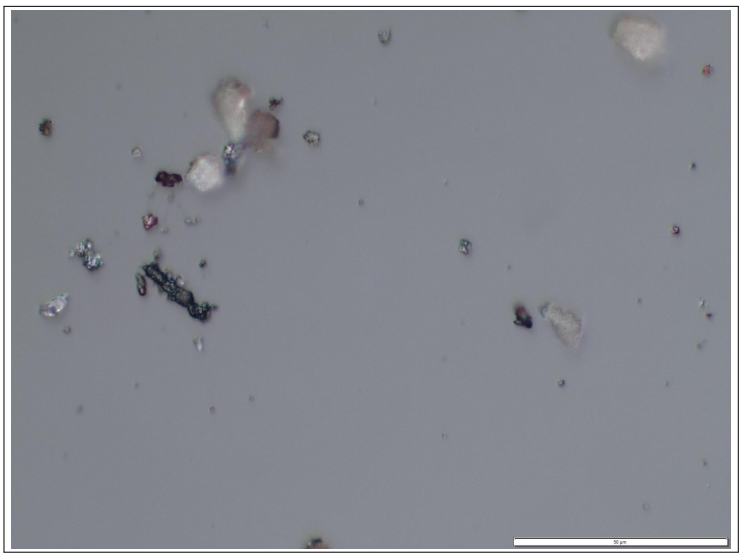
non ferrous wear particle



larger ferrous wear



non ferrous wear and contaminant particles



contaminant particles